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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,556	09/09/2003	Mehdi Vaez-Iravani	TNCR.207US1	3091

7590 10/19/2005

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EXAMINER	
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ART UNIT	**PAPER NUMBER**
2877	

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,556	VAEZ-IRAVANI, MEHDI	
	Examiner	Art Unit	
	Michael P. Stafira	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/18/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1 and 32 are objected to because of the following informalities: In claims 1 and 32 applicant discloses "and/or a second beam" but the further limitations in the claim include the second beam, therefore the "and/or" should be changed to "and" for proper clarification. For examination purposes the examiner is going to use a first and a second beam of radiation. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3,6-7, 9-11, 14-17, 19, 23-26, 28, 30-31 rejected under 35 U.S.C. 102(e) as being anticipated by Vaez-Iravani et al. ('730)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim 1

Vaez-Iravani et al. ('730) discloses a source supplying a first (Fig. 1, Ref. 22) and a second beam (Fig. 1, Ref. 24) of radiation to a surface (Fig. 1, Ref. 26) to be inspected, wherein the first beam (Fig. 1, Ref. 22) is substantially normal to the surface (Fig. 1, Ref. 22) and the second beam (Fig. 1, Ref. 24) is at an oblique angle to the surface (Fig. 1, Ref. 26); and optics (Fig. 3a, Ref. 72) comprising optical devices at different azimuthal angles about a line normal (Fig. 1, Ref. 36) to the surface (Fig. 1, Ref. 26) or about a direction corresponding thereto, the devices disposed so that radiation scattered by the surface at different azimuthal angles with respect to the line is directed to different devices without employing a common collecting instrument (Col. 6, lines 38-61; Col. 9, lines 26-41), and a collector (Fig. 1, Ref. 60) substantially in a double dark field arrangement relative to the second beam (Fig. 1, Ref. 40) and having an aperture larger than that of any one of the optical devices collecting radiation scattered by the

surface (Col. 5, lines 42-52).

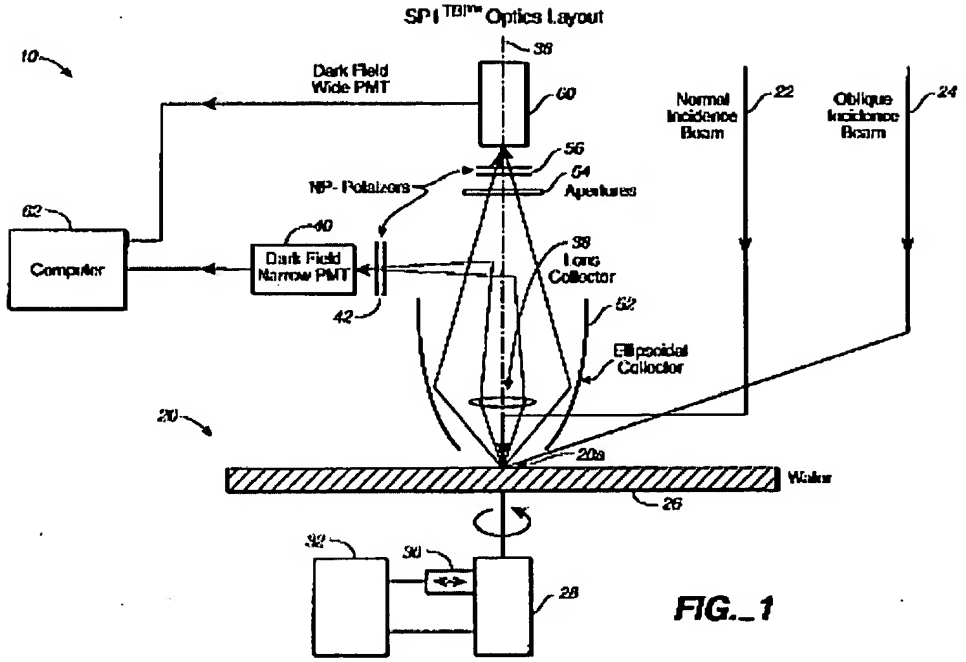

FIG._1

Claim 2

Vaez-Iravani et al. ('730) further discloses the optics comprising a first set of optical devices (Fig. 3a, Ref. 72) receiving radiation scattered by the surface in directions near the line, and a second set of optical devices (Fig. 4, Ref. 82) receiving radiation scattered by the surface at low elevation angles to the surface.

Claim 3

The reference of Vaez-Iravani et al. ('730) further discloses the first set of optical devices (Fig. 3a, Ref. 72) comprises 6 to 10 optical devices forming substantially a ring around the line (See Fig. 3a).

Claim 6

Vaez-Iravani et al. ('730) discloses a plurality of detectors converting the radiation

scattered by the surface and reaching at least some of the devices and the at least one collector into respective signals representative of radiation scattered at different azimuthal angles about the line (Col. 6-7, lines 38-7).

Claim 7

Vaez-Iravani et al. ('730) further discloses a processor (Fig. 1, Ref. 62) determining the presence of anomalies in or on the surface from said signals.

Claim 9

Vaez-Iravani et al. ('730) further discloses the processor (Fig. 1, Ref. 62) compares signals or pairs of signals converted from radiation received by some of the optical devices in the first set located substantially on opposite sides of the line, to determine the presence of micro-scratches on the semiconductor wafer surface after it has been chemically and mechanically polished (Col. 9, lines 42-58).

Claim 10

Vaez-Iravani et al. ('730) further discloses optical devices comprising optical fibers (Fig. 3a), said fibers conveying radiation scattered by the surface and reaching at least some of the devices to the detectors (Col. 6, lines 38-61).

Claim 11

Vaez-Iravani et al. ('730) further discloses the optical fibers are multimode (See Fig. 3a).

Claim 14

Vaez-Iravani et al. ('730) further discloses at least one polarizer (Fig. 1, Ref. 42) in an optical path of the second beam, said polarizer interacting with the second beam before or after the surface interacts with the second beam (See Fig. 1).

Claim 15

Vaez-Iravani et al. ('730) further discloses at least one polarizer polarizing radiation of the second beam before the beam reaches the surface (Col. 3, lines 48-56).

Claim 16

The reference of Vaez-Iravani et al. ('730) further discloses at least one polarizer passes P-polarized, and the at least one collector collects unpolarized radiation scattered by the surface (Col. 3, lines 48-56).

Claim 17

Vaez-Iravani et al. ('730) further discloses at least one polarizer passes S-polarized radiation, said apparatus further comprising another polarizer that passes S-polarized radiation and that is located in an optical path of radiation scattered by the surface and collected by the collector (Col. 3, lines 48-56).

Claim 19

Vaez-Iravani et al. ('730) further discloses said source further comprising one radiation emitting elements supplying the first and second beams (Fig. 1, Ref. 22, 24).

Claim 23

Vaez-Iravani et al. ('730) further discloses the optical devices (Fig. 3a, Ref. 70) disposed symmetrically about the line or the direction (Col. 9, lines 26-41).

Claim 24

Vaez-Iravani et al. ('730) further discloses the optical devices disposed at elevation angles away from expected components scattered by the pattern (Col. 6, lines 38-61).

Claim 25

Vaez-Iravani et al. ('730) further discloses the expected components scattered by the pattern are Fourier components (Col. 6, lines 45-49).

Claim 26

The reference of Vaez-Iravani et al. ('730) further discloses the elevation angles between about 5 and 20 degrees from the line or the direction (Col. 17, lines 33-37).

Claim 28

The reference of Vaez-Iravani et al. ('730) further discloses a compact optical head (Fig. 5a, Ref. 10).

Claim 30

Vaez-Iravani et al. ('730) further discloses the collector comprises at least one objective focusing (Fig. 1, Ref. 38) radiation scattered by the surface to a detector.

Claim 31

The reference of Vaez-Iravani et al. ('730) further discloses the collector comprises a plurality of optical fibers collecting radiation scattered by the surface (Fig. 3a, Ref. 72).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 4-5, 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaez-Iravani et al. ('730) in view of Marxer et al. ('916).

Claim 4, 5

Vaez-Iravani et al. ('730) substantially teaches the claimed invention except that it does not show the first optical device receive radiation at 10-30 degrees or the second optical device at 10-40. Marxer et al. ('916) shows that it is known to provide optical devices that receive light with in the ranges claimed (See Fig. 7) for an optical surface inspection device. It would have been obvious to combine the device of Vaez-Iravani et al. ('730) with the different angles of radiation of Marxer et al. ('916) for the purpose of providing detection of scattered light over angles that show different types of defects, therefore providing a more accurate inspection of the surface.

Claim 12, 13

Vaez-Iravani et al. ('730) substantially teaches the claimed invention except that it does not show the second optical device receive radiation at 20-60 degrees or the second optical device at 40-60. Marxer et al. ('916) shows that it is known to provide optical devices that receive light with in the ranges claimed (See Fig. 7) for an optical surface inspection device. It would have been obvious to combine the device of Vaez-Iravani et al. ('730) with the different angles of radiation of Marxer et al. ('916) for the purpose of providing detection of scattered light over angles that show different types of defects, therefore providing a more accurate inspection of the surface.

6. Claims 8, 18, 20-22, 27, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaez-Iravani et al. ('730).

Claim 8

Vaez-Iravani et al. ('730) discloses the claimed invention except for the source supplies the first beam not the second beam of radiation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with a source supplying a first beam not a second since it was well known in the art that using multiple beam supplies allows the use of different wavelengths, therefore increasing the sensitivity of the measurement by measuring defects sensitive to different wavelengths.

Vaez-Iravani et al. ('730) further discloses the processor (Fig. 1, Ref. 62) processes signals converted from radiation received by the first set of optical devices to determine the presence of defects on a semiconductor wafer surface after it has been chemically and mechanically polished (Col. 5, lines 42-52).

Claim 18

Vaez-Iravani et al. ('730) discloses the claimed invention except for two optical fibers supply the first and second beams. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with two optical fiber supply beams since it was well known in the art that using optical fiber supplies reduces cross-take between the projected light, therefore increasing the sensitivity of the measurement.

Claim 20

Vaez-Iravani et al. ('730) discloses the claimed invention except for the fibers being single-mode fibers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with the single mode fibers since it was well known in the art that using single mode fibers prevent cross-talk between optical fibers,

therefore increasing the accuracy of the measurement.

Claim 21

Vaez-Iravani et al. ('730) discloses the claimed invention except for the fibers include a core, cladding for separating the collection aperture of each fiber. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with the core and cladding since it was well known in the art that optical fibers having a core and cladding so as to protect the core from damage, therefore increasing the durability of the fiber.

Claim 22

Vaez-Iravani et al. ('730) discloses the claimed invention except for an external coating over the cladding. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with the external coating since it was well known in the art that using an external coating increases the strength of the fiber, therefore preventing accidental breakage.

Claim 27

Vaez-Iravani et al. ('730) discloses the apertures are centered at +90 and –90 degrees relative to a plane of incidence of the second beam (Col. 10, lines 20-26).

Vaez-Iravani et al. ('730) discloses the claimed invention except for having two lenses. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with the two lenses since it was well known in the art that using lenses increase the amount of light hitting the photodetectors, therefore decreasing the amount of wasted light.

Claim 29

Vaez-Iravani et al. ('730) discloses the claimed invention except for the compact optical head does not exceed 5 cm. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Vaez-Iravani et al. ('730) with the size requirements of 5 cm since it was well known in the art that having the optical head no greater than 5 cm allows the device to remain small, therefore making the device more lightweight.

7. Claims 32- 47 are rejected under 35 U.S.C. 102(e) as being anticipated by Vaez-Iravani et al. ('730)

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim 32

Vaez-Iravani et al. ('730) discloses causing the source to supply the first (Fig. 1, Ref. 22) and/or second beam (Fig. 1, Ref. 24) to the surface (Fig. 1, Ref. 26) and causing the surface to be scanned by the beam; directing radiation scattered by the surface to the optical devices without employing a common collecting instrument (See Fig. 3a, 4); detecting radiation (Fig. 1, Ref. 40, 60) scattered by the surface and collected by the devices and/or the at least one collector; and determining from the detected radiation anomalies on different types of surfaces (Col. 5, lines

42-52).

Claim 33

Vaez-Iravani et al. ('730) discloses determining from the detected radiation anomalies on and patterned wafers (Col. 6, lines 45-49).

Claim 34

The reference of Vaez-Iravani et al. ('730) further discloses determining from the detected radiation anomalies on patterned wafers, and wafer surfaces after chemical and mechanical polishing (Col. 3, lines 39-40).

Claim 35

Vaez-Iravani et al. ('730) further discloses causing causes the second beam (Fig. 1, Ref. 24) to be supplied to the surface (Fig. 1, Ref. 26), and the detecting detects radiation scattered by the surface and collected by the at least one collector (See Fig. 4).

Claim 36

The reference of Vaez-Iravani et al. ('730) further discloses causing the second beam to be polarized (Col. 11, lines 43-67).

Claim 37

Vaez-Iravani et al. ('730) discloses the second beam is caused to be P-polarized and the detecting detects unpolarized radiation for detecting anomalies on smooth surfaces (Col. 11, lines 43-67).

Claim 38

Vaez-Iravani et al. ('730) further discloses the second beam is caused to be circularly polarized and the detecting detects unpolarized radiation for detecting anomalies on surfaces of

dielectric layers (Col. 11, lines 60-62).

Claim 39

Vaez-Iravani et al. ('730) discloses the second beam is caused to be S-polarized and the detecting detects S-polarized radiation for detecting anomalies on rough surfaces (Col. 11, lines 43-67).

Claim 40

The reference of Vaez-Iravani et al. ('730) further discloses causing the source to supply the first beam (Fig. 1, Ref. 22) to the surface (Fig. 1, Ref. 26); detecting radiation (Fig. 1, Ref. 40, 60) scattered by the surface and collected by the optical devices; and determining from the detected radiation micro-scratches on different types of surfaces (Col. 5,lines 50-52).

Claim 41

Vaez-Iravani et al. ('730) discloses a first set of optical devices (Fig. 3a, Ref. 72) receiving radiation scattered by the surface in directions near the line or the direction, and a second set of optical devices (Fig. 4, Ref. 82) receiving radiation scattered by the surface at low elevation angles to the surface, wherein the detecting in detects radiation scattered by the surface and collected by the first set of optical devices, and wherein said determining comprises comparing signals or pairs of signals converted from radiation received by some of the optical devices in the first set located substantially on opposite sides of the line (Col. 9, lines 55-58).

Claim 42

Vaez-Iravani et al. ('730) further discloses detects radiation scattered by the surface and collected by the second set of optical devices (Fig. 4, Ref. 82), and wherein said determining detected radiation anomalies on patterned or unpatterned surfaces (Col. 5, lines 50-52; Col. 6,

lines 45-48).

Claim 43

Vaez-Iravani et al. ('730) further discloses causing the second beam (Fig. 1, Ref. 24) to be supplied to the surface (Fig. 1, Ref. 26), and the detecting detects radiation scattered by the surface and collected by the optical devices (Col. 7, lines 8-14).

Claim 44

The reference of Vaez-Iravani et al. ('730) further discloses the detecting by means of detectors (Fig. 1, Ref. 40, 60), and the determining determines anomalies without using output signals of detectors that are saturated (Col. 13, lines 35-47).

Claim 45

Vaez-Iravani et al. ('730) discloses sampling outputs of the detectors, and the anomalies on the surface from minimum values of the detector output samples (Col. 12, lines 55-60).

Claim 46

The reference of Vaez-Iravani et al. ('730) further discloses detecting by means of detectors that provide output signals, and the detecting comprises sampling the output signals, and the determining determines anomalies on the surface from minimum values of the detector output samples (Col. 12, lines 37-62).

Claim 47

Vaez-Iravani et al. ('730) discloses the surface is unpatterned, further comprising selecting from the optical devices only those optical devices that collect radiation scattered by the surface within a predetermined azimuthal collection angle and wherein said detecting in

detects only the radiation scattered by the surface and collected by the selected optical devices (Col. 7, lines 51-63).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Stafira whose telephone number is 571-272-2430. The examiner can normally be reached on 4/10 Schedule Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael P. Stafira
Primary Examiner
Art Unit 2877

October 12, 2005